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The Fire-flies of Siam.

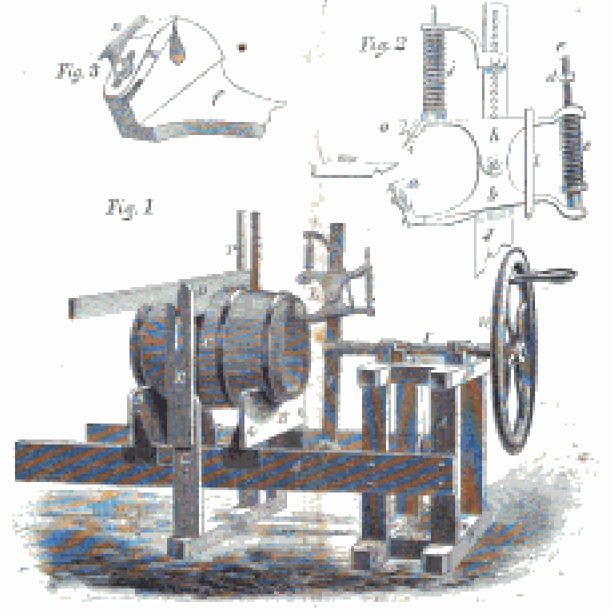
Sir J. Bowring thus speaks of these remarkable insects:—"They glance like shooting stars, but brighter and lovelier, through the air, as soon as the sun is set. Their light is intense, and beautiful in color as it is brilliant in splendor—now shining, soon extinguished. They have their favorite trees, round which they sport in countless multitudes, and produce a magnificent and living illumination; their light blazes and is extinguished by a common sympathy. At one moment every leaf and branch appears decorated with diamond-like fire; and soon there is darkness, to be again succeeded by flashes from innumerable lamps, which whirl about in rapid agitation. If stars be the poetry of heaven, earth has nothing more poetic than the tropical fire-fly."

Improved Stave or Barrel Machine.

A vast amount of time and money has been spent by different persons in attempting and aiding the perfection of barrel machinery, and one of the great difficulties to overcome was that of obtaining a machine that would cut a chamfer, level, howell, and croze, leaving always an equal thickness of wood outside the croze whatever was the shape of the cask. It was possible to cut segments of a perfect circle in staves, but as they never or seldom fitted together in that shape, the heads would never perfectly fit the croze without compression into that shape by iron hoops. This machine, however, takes the cask when in the usual truss hoops and by gauging from the outside by the gauge wheel, O, cuts the croze in the cask, whatever be its shape, and works it off ready for the head; it is equally applicable to "tight" or "loose" work, and may be operated by hand or power. It can be adjusted in five minutes to work on any sized cask and it cuts the croze, howell, level and chamfer at the same time, as will be seen by the arrangement of the knives in Fig. 3.

In our engravings Fig. 1 is a view of the whole in perspective, in which A is the frame, B, two supports to hold the barrel C, and D, a lever, fastened to a fulcrum on F, and having a piece, E, depending from it, a catch which hooks into notches on G, thus keeping the barrel perfectly steady during the operation of cutting. On the frame, A, is supported the shaft, I, in journals, which is rotated by the fly-wheel and handle, H, and having on its other end the piece, J, at right angles to itself, carrying at one end the weight, K, as a counterbalance to the cutting apparatus, L, that can be moved up and down to groove any sized cask. By reference to the diagrams Figs. 2 and 3, the arrangement of the cutting device will be fully understood. J is the piece to which it is attached, broken off, having a number of holes perforated in it, to admit of

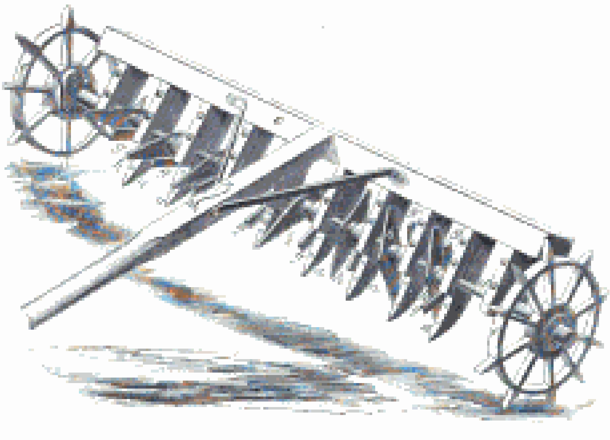
SWAN'S STAVE OR BARREL MACHINE.



the knife being adjusted to various sized barrels. It consists in a knife, a, placed on a lever, b, which is pressed to its work by the spring, c, and the depth which it will cut the groove is regulated by the nut, d, on the screw, e, this gives the bevel and the groove, as shown on the end of the stave in the diagram. Another lever, k, moving on the same axis, g, carries a small saw, i, which cuts off the excess of wood on the stave, and a gauge-wheel, O, which regulates the depth of the cut, it is kept to its work by the spring, j, pressing against the arm, when the catch, h, is released, this catch keeping them both from the stuff. Fig. 3 shows further the construction of the knives; l, being the one that excavates the croze and m, the one that cuts the chamfer, both being screwed on to the end of b, shown at f.

This is the invention of George H. Swan, of Bridgeport, Ct., and was patented to him on the 12th of June, 1855. All further particulars may be obtained by applying to James De Martin of the same place, who will supply machines or territory.

AUGSPURGER'S STUBBLE CUTTER.



This machine is intended to cut away the common stubble off the ground before plowing, which it accomplishes by means of a series of rotary knives cutting shearwise with the teeth of a rake as it is drawn along the ground. The inventor states that it cuts to pieces all corn stalks, weeds and briars at the rate of fifteen acres a day, and may be drawn by one or two horses as the nature of the ground requires, and should be used during dry weather when the stubble is "brash." In our engraving, a, a, are a set of rake teeth mounted in a bearer or head, C, from which a tongue, projects at such an angle as to place the teeth at about fifty degrees from a horizontal position. A shaft, d, is journaled to the teeth, a, and carries at each of its ends the wheels, e, of such a diameter that when the team are harnessed to the pole, the points of the teeth barely graze the ground. Each ground wheel, e, is attached to the shaft, d, by means of a ratchet movement, f, so as to secure the perfect action of the knives, g, and yet permit of a deviation from a straight course, and they also allow the machine to be backed without revolving the knives, which are arranged spirally on the shaft to make their action uniform. The sweeps, h, clean away the trash and prevent the clogging of the knives.

It was patented the 1st of Sept., 1857, and is the invention of John Augspurger, of Trenton, Ohio, who will give any further information.

Telegrams.

This short word has lately come into general newspaper use in Great Britain as a substitute for the long compound term, *telegraphic despatch*. We like it, and are glad to perceive by recent London papers that it is to become a recognized word of our language, and that it will appear as such in a new edition of Johnson's Dictionary about to be published under the care of the eminent Dr. Latham. Quite a controversy was carried on for some time by the London philologists and would-be philologists, in the papers, respecting its use, one party asserting that it was a positively ungrammatical term, and could not be employed to signify the thing for which it was used, while the other party, with the soundest logic, asserted that it was as correct as the majority of words in a language distinguished for its vast number of exceptions to general grammatical rules.

Some of the newspapers in our city now use this term, but we perceive that the Philadelphia *Ledger* has coined one for itself over its telegraphic column, namely, *Necessage!* We do not like it so well as *telegram*. Every one to their taste, however, but it would certainly look rather droll, upon the same principle, to call the printing performed by all the Hoe presses, *Hoeotype!*

Gas Flame Furnace for Boilers.

An apparatus for burning gas instead of coal under a steam boiler has lately been applied at the navy yard of Cherbourg, France. Instead of burning the fuel directly below the boiler, it is first converted into gas through a pipe to the boiler furnace, where it is supplied with air by a blower. After being ignited, the flames act directly on the fire surface of the boiler, while the heated gases of combustion pass through the flues, and escape into the atmosphere through a very short chimney, a high one not being required on account of the use of the fan-blower to produce the proper draft. This method of generating steam appears to us to be as sensible as the addition of wheels and levers to a simple machine for the purpose of gaining power.

The Wave Line System.

This term was first applied to the outside form of vessels by J. Scott Russell, meaning thereby, it has been stated, a hollow water line something of the shape of a razor blade. In the London *Mechanics' Magazine*, a rather sharp controversy has been going on for some time, as to what the wave line really means, and what are its advantages. Some say, ships built of this form do not possess the merits claimed for them; but an old "salt," signing himself *Neptune*, is enthusiastic in favor of it, and asserts that he taught the father of the late George Steers how to construct vessels on this principle, which was carried out so successfully in the yacht *America*.

Issued from the United States Patent Office

FOR THE WEEK ENDING DECEMBER 22, 1857.

[Reported officially for the Scientific American.]

Encouragement to Inventors.

MESSRS. EDITORS—I was much gratified on my return home to find the patent on my corn planter at the Post-office, it being the third one that I have taken out through your hands, and I must acknowledge myself much indebted to you for your promptness in prosecuting my business, as I am satisfied that you did it much better and cheaper than I could have done myself. My patents are proving a nice fortune to me, all of which I owe to the columns of the SCIENTIFIC AMERICAN, which was the medium through which my inventive faculties were unfolded, showing what was invented and what was still needed. If I had never taken the SCIENTIFIC AMERICAN, I never would have taken out the patents I have, which yield me a handsome income.

D. M. HUGHES.

Palmyra, Mo., Dec., 1857.

[We are glad to lay before our readers the above letter. It speaks encouragement to inventors, and invigorates to them the best facilities for securing and publishing to the world a knowledge of their improvements.

FUNGUS.—This is a disease common to all plants, and is due to the growth of minute fungi in their cellular tissue, thus stopping the passage of the nutritive fluids.

[For the Scientific American.]

Pennsylvania Salt and Oil.

MESSRS. EDITORS—Some information regarding the manufacture of salt and oil, in the western part of this State, may be interesting to your readers. At a very early day (1812) borings for salt water were commenced in this neighborhood, resulting in such success as to realize the most ardent expectations. At first, these borings were small gimblet holes, in a very few instances exceeding 1½ inches diameter; these were drilled by wooden rods, connected together by iron screw joints, the steel drill being attached to the bottom. By a spring pole and treadle, the poles and bit attached were kept in an up-and-down motion with the foot, whilst the workman turned the poles with his hands, to prevent the drill from sticking in the rock. The bits were dressed V-shaped, and at every downward stroke cut the rock, grinding it into fine sand. After boring for some time, the sand was withdrawn from the well by a pump attached to the poles. Such were the earliest attempts at boring for salt water. We now employ the steam engine, and all the appliances of modern wisdom and invention. From 1½ inch, we now use drills 3, 4, 5, 6, and even 7 and 8 inches diameter. We have substituted the rope for the poles, considering it much more speedy. The borings are through alternate layers of slate and sandstone, of various degrees of hardness and color. At a depth of about 300 feet we come upon a very hard, fine, bluish gray sandstone, known amongst "salt men" as the "forty-foot rock," so named because of it being a solid strata, without any change, of about that thickness. In this rock and under it, we generally look for the first vein of salt water worth working. We then have slate and light veins of sandstone until we come upon "the eighty-foot rock," at a depth of about 460 feet, and so on to the next two heavy stratas of sandstone rock, viz., "the 150 and 300 feet rocks"—doubling as we progress downward, and seeming to increase in hardness, at times almost defying the hardest tempered cast steel.

From one of our salt wells we obtain oil in a considerable quantity. It is called petroleum or rock oil; it is pumped up out of the well with the salt water, into cisterns, and the oil being the lighter fluid, is drawn off from the top, and barreled up for market. It is a beautiful, clear, reddish oil, almost devoid of smell, containing but a trace of asphaltum. In the still, three-fourths of its bulk is resolved into pure naphtha, which is sold under the name of carbon oil. It makes a valuable burning fluid, perfectly non-explosive, burning in any common lamp, with a brilliancy only equaled and surpassed by gas. As a lubricator (after undergoing a manufacturing process) it is fast coming into general use, and gives decided satisfaction; its cheapness also recommending it for this purpose. Thus we have combined two of the most useful products in nature—salt and oil.

IRWIN & PETERSON.

Tarentum, Pa., December, 1857.

[The source of naphtha springs is a question of much interest in natural science. Naphtha is produced artificially in the distillation of bituminous coal, hence it is believed that the springs which furnish this hydro-carbon fluid are supplied by the subterranean distillation of coal beds by internal heat. Thus it would be inferred that in the production of the anthracite coal beds of Pennsylvania from bituminous coal, large quantities of naphtha would have been produced, which, flowing down from a higher to a lower level, according to the law of gravity and the nature of fluids, would be found between retaining strata, such as that described by our correspondent. Naphtha is found in Pennsylvania, not far from the coal beds, also in western New York, in Monroe county, a great distance from the coal fields. This is not strange, however, because subterranean streams of water are found hundreds of miles distant from their fountain-heads.—EDS.

Power of a Re-issued Patent.

MESSRS. EDITORS—Two years since a patent was granted to A, and one year since, on the same article, a patent was issued to B, which is said to infringe on A. Six months after B's patent is issued, A gets his patent re-issued: does A lose his prior claim by having his patent re-issued after B's has been granted, or is it still an infringement of A's patent?

A. B. AMBLER.

Bridgeport, Conn., Dec., 1857.

[A re-issued patent has just the same force and power that it had before it was re-issued, because its existence dates from the day of its first issue, not its second. A cannot lose his prior claim, if it was a good one, by the re-issue of his patent, after B's was granted. If a patent has been issued to B, covering an invention for which a patent had previously been granted to A, then, in the eye of the law, the patent of B is null and void, unless he can prove priority of invention.

Russian Patent Affairs.

It cannot prove otherwise than interesting to American inventors to know what is doing in the patent business in a country of sixty millions of inhabitants. In the last number of the transactions of the Imperial Agricultural Society of St. Petersburg, for the year 1855 (a bi-annual publication) a list of patents granted and expiring during the years 1852-53-54 was published. Although patent affairs are in their infancy in that country, these reports contain much matter of interest, and we may state that they are printed in German, which is the scientific language of Russia. When we take into consideration that the galvanoplastic process of printing from photographs was discovered by Prof. Jacobi, of St. Petersburg, (who is however an Austrian by birth,) we shall not underrate the inventive genius of the country, nor shall we undervalue the greatness of the national character which manifests itself in Russian intercourse with foreigners, as is also shown in this patent report; we mean their exemplary readiness to acknowledge foreign merits. To the names of inventors is added their nationality, whether native Russian or foreigner, and if foreign, the country of their birth. Interferences or injunctions are not known, and a patent right is seldom sold, except to the government. Let us now look to the list, from which we find that

In 1852, 11 patents were issued to Russians.
" " 12 " " " " Foreigners.
" 1853, 19 " " " " Russians.
" " 11 " " " " Foreigners.
" 1854, 26 " " " " Russians.
" " 18 " " " " Foreigners.

In the three years 97 patents were issued, of which 41 were to foreigners, many of whom were *Americans*. Patents are granted in Russia from three to ten years in duration according to their merit.

L. E. BERNBACH.

Coal Oil of Western Virginia.

The *Kanawha Star*, commenting upon the value of the fields of cannel coal in Western Virginia, for the produce of oil, says:—

"Let us estimate this cannel coal-field of Western Virginia at two gallons per bushel, and the result is 1,672,704,000,000 gallons—oil enough, we should think, to grease and light the globe, and certainly much more than ever swam in all the whales since Jonah's time. The value of 1,672,704,000,000 gallons of oil at the present market price of 60 cents per gallon would amount to $1,003,622,400,000."

Topographical Charts.

We have received from Chas. W. Welsh, Chief Clerk of the Navy Department, a number of charts of the river Paraguay, surveyed and explored by Commander Thomas J. Page, of the U. S. steamer Waterwitch, in 1855. We have to tender our thanks for them, as they form valuable acquisitions to our library.

Protecting the Mouths of Mine Shafts.

Mr. W. Reid, of Shettleston, Lanarkshire, Scotland, has specified an invention to guard the mouths of pits and mine shafts during their actual working, so as to prevent accidents from workpeople or attendants falling down such openings. As applied to an ordinary coal-pit mouth, his apparatus consists of an open rectangular timber frame, large enough to embrace the opening at the head of the shaft—this frame has its two ends hinged so as that it can be easily opened out for adjustment in its place, without interfering with the winding rope or cage. When the cage is down the shaft, this guard frame stands upon the pit mouth, so that nothing can fall down the shaft; but when the cage is wound upwards, projections upon the cage come in contact with the foot of the frame, and lift it up clear of the pit's mouth. This action carries the guard frame clear away from the pit's mouth, so as to allow of full access thereto, while at this time the cage itself forms the guard, and prevents anything from falling down the shaft. In this way a most effective guard is kept over the pit's mouth at all times of the actual working of the pit, while at the same time this protective apparatus does not in any way impede the operations of the attendants or miners. The same apparatus, suitably modified, is applicable in a variety of situations where dangerous openings are to be guarded, as, for example, to all shafts or excavations, and to the mouths of elevators for feeding blast furnaces.

The New Senate Chamber.

The Senate Chamber in the new Capitol will be ready for use this time next year, perhaps sooner, and the House has voted that they move into it when fit to receive them. The dimensions of the new hall are as follows: 139 feet long, 93 feet wide, and 36 feet high. A greater hight would have added to its architectural beauty, but would have deteriorated its advantages as a place of public speaking. The decorations are good and the general style is rich and magnificent, being a great contrast to the usual bare walls of public edifices. In the internal arrangements the Speaker has established an excellent rule, which is, to confine the members of the press to a gallery provided for them, and they will no longer be allowed to occupy a portion of the floor as formerly. Capt. Meiggs says that the ventilation of the new hall at Washington will be improved by a steam fan which he is now preparing, and which is capable of throwing ninety thousand cubic feet of solid air into the hall per minute, which will provide a complete renewal of air in the Chamber every five minutes, as the cubic capacity of the room is not over 400,000 feet. No amount of Congressional corruption can contaminate such a torrent of purity as this. It breathes the very freshness of the firmament.

Respiration.

This process, common to all animals, is accomplished by means of certain organs called the lungs, and the end which it serves in the animal organism is to remove the excess of carbon in the form of carbonic acid from the blood. From the quantity of this gas emitted from the lungs in a certain time, it has been attempted to be ascertained what is the quantity of solid carbon thus thrown off, but the usual estimate of twelve ounces per day is evidently too much, as it is a great deal more than we take into the system as food, about half that or six ounces would be nearer the mark. It is essential to our general health and life that we should have continually a sufficient quantity of fresh air wherever we are, that it may supply the place of the carbonic acid emitted, for to take that into the lungs again is poison.

LENGTH OF LIFE.—The married are longer lived than the single; and above all, those who observe a sober and industrious conduct. Tall men live longer than short ones. Women have more chances of life previous to the age of fifty years than men, but fewer after.

Standard of Measures.

It is necessary in all countries where commerce is in any way encouraged, that some standard of measure and weight should be adopted. In this country and Great Britain the yard is the standard of measure, the length of which is determined by the vibration of the seconds pendulum at London in a vacuum at the level of the sea; but as the length of the pendulum varies in different latitudes, the yard is a little longer in New York than London, because of the pendulum in the former place being about the one-eighth of an inch longer than in the latter. This yard is divided into thirty-six inches or three feet. The old method of teaching the tables of measure was very vague, as it commenced with the statement that "Three barleycorns make one inch," which, to say the best, was a remarkably uncertain method of fixing a standard, as barleycorns are very liable to differ considerably in size.

The French, on the other hand, take a quarter of the earth's circumference, and dividing that into ten million parts, take one of them, which is equal to 39·371 standard inches, and, calling it a metre, form all their weights and measures. As the circumference of the earth is not likely to vary much with time or temperature, and cannot meet with the accident that befel the standard British yard, which was melted in the old Houses of Parliament when they were burned, it is decidedly the most accurate; but so long as we have some given and known standard, it does not much matter what it is.

Electric Apparatus for Blasting.

In a report made by M. Ebner, to the Austrian Academy of Sciences, on the subject of employing electricity, or voltaism, for the purpose of exploding mines of gunpowder, or blasting in slate or stone quarries, and other engineering operations—a preference is given to the former, because the amount of effect of the voltaic battery depends on the quality of the conductor through which it acts. The apparatus employed in the Austrian engineering service consists of two disks, twelve inches in diameter, and the charge is made by merely placing a point between the plates. The conductor consists of soft brass wire, and each apparatus is furnished with 12,000 feet of plain wire, and 2,400 feet of insulated wire, being coated with gutta percha. The explosive substance employed is a mixture of sulphur, antimony, and chloride of potash, which can be made with ease in the form of a cartridge, and placed at any part of the conducting line. With these machines explosions have been effected at a distance of a German league and a-half; and fifty mines were discharged simultaneously, on a line of one hundred fathoms.

Copying Ink for Printing.

The following is a recipe for making copying ink, which resembles printing ink for its deep, rich black shade:—Take nutgalls 24 lbs.; sulphate of iron, 6 lbs.; gum senegal, 12 lbs.; molasses, 6 lbs.; soap, 3 lbs.; lamp black, 6 lbs.; Prussian blue, 3 lbs.; and filtered rain water, 15 gallons. The nutgalls are first bruised, and then boiled for about three hours, more or less, in half the above-named quantity of water, and the clear liquid is drawn off. The gum and sulphate of iron and the other ingredients are separately dissolved in the remaining quantity of water, and the whole added together and thoroughly incorporated by stirring while hot.

Congressional Committees.

Speaker Orr has selected the following members for the Committee on Patents in the House of Representatives:—Hons. James A. Stewart, of Maryland; Wm. B. Maclay, of New York; W. Reilly, of Pennsylvania; J. R. Edie, of Ohio; W. D. Brayton, of Rhode Island.

The Senate's Committee consists of Hons. D. S. Reid, of North Carolina; J. J. Evans, of South Carolina; D. L. Yulee, of Florida; J. S. Simmons, of Rhode Island; and L. Trumbull, of Illinois.

New Inventions.

Stereoscopic Discoveries.

At a recent meeting of the Liverpool Photographic Society, Mr. Forrest introduced to the society a very novel and simple idea which had been brought under his notice the previous day by a Liverpool gentleman, Mr. Gill, by which a stereoscopic photograph can be taken with a single lens, and with an ordinary camera. By Mr. Gill's process the object looks into two mirrors joined in the center, raised at each side so as to reflect two figures, and these being opposite the lens, two pictures are taken with one lens. But not only are the two pictures taken at one sitting, but they are non-inverted, which is also a great advantage obtained by the discovery.

Breech-loading Cannon.

The invention of G. W. Bishop, of Brooklyn, N. Y., (which was described on page 19, Vol. 13, of the SCIENTIFIC AMERICAN,) has since been patented in England and France through the Scientific American Agency. The application of expanded segments to fasten in the breech during the firing, is a safe and novel way of rendering it firm; and the inventor informed us that he has sent a ball two miles and a-half with one of his cannon, using a cartridge containing four pounds of powder. The governments of this country and Great Britain will, we believe, shortly give it a trial, and we have no doubt that it will quite fulfill the expectation of the inventor.

Improved Pump.

Harman A. Sheldon, of Middlebury, Vt., has invented a new pump which is especially applicable to the raising of corrosive liquids, such as vitriol and the acids. If a common pump of any of the usual forms be used to lift one of the fluids, they eat away the barrel and valves of the pump, and in a short time render them useless. The inventor adds a supplementary chamber into which the liquid is received and ejected from it without touching the valves or barrel of the pump. It may also be applied to pumping liquids containing sand and gritty materials, as they have no connection with the working parts of the pump.

Grate Damper.

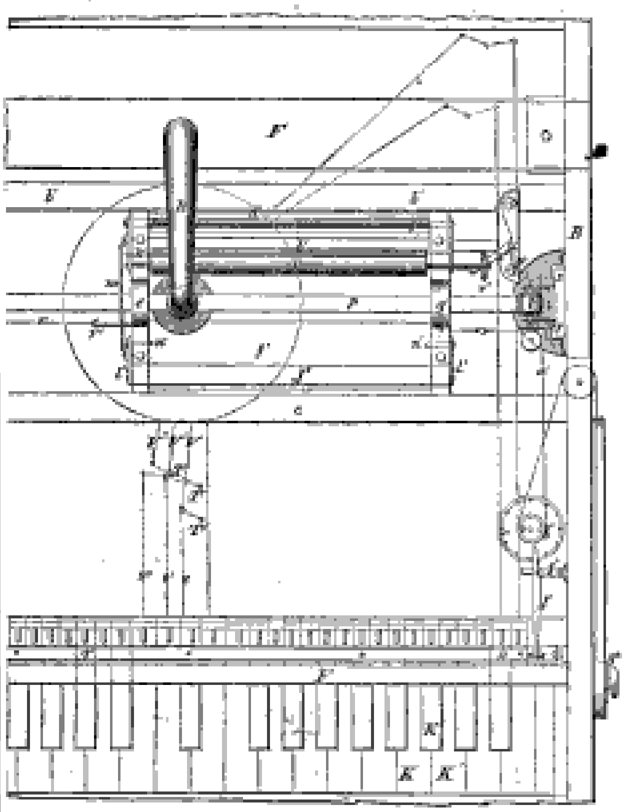
This invention consists in constructing the damper in a novel manner, whereby the strength of the draught may be regulated as desired, so that a full and strong one may be obtained when kindling the fire by withdrawing the damper, and when a small draught is required, the damper can be regulated so as to allow only the gas to escape, retaining the heat in the room. This invention meets an objection that is often made to open fires, namely, that they carry a great quantity of heat up the chimney and consequently consume a great quantity of fuel. These defects are obviated by having the damper made of two frames hinged the one to the other. It is the invention of Owen Collins and John Dooley, of New York, who have assigned it to John O'Brien, of the same place. It was patented this week.

Steam Cotton Press.

Cotton is a loose fibrous material occupying a great amount of space, and it would never do to export it in the loose state, because the amount of the freight would then be of more consideration than the value of the cotton itself, so the method of packing it by means of presses has always been employed in cotton exporting countries. The aim of these presses is to make the fibers lie quite close together with no air between; and so far is this condensing process carried, that cotton in the bale is often only one-tenth of its original bulk. These presses have been, first, the old screw press, which was replaced by the hydraulic one, and now the steam press is gradually gaining ground and it is an improvement on this last kind that has been invented and patented by John Roy, of New Orleans. This invention consists in economizing the steam so that all its power is extracted before being blown away. This is done by the use of three steam cylinders, one being much larger than the other two, and having them arranged so that a progressive power is obtained. By this means the smallest amount of power is used at first which gradually increases as the size of the bale decreases; in other words, the press supplies the power in the ratio in which it is required.

FRANCIS' PRINTING MACHINE.

FIG. I.



This printing machine is intended to be used by such persons as may want to preserve legible copies of their writings or ideas, and is specially adapted for the use of clergymen, editors, merchants, and literary men. It is operated by piano keys, each of which carries a letter, and by pressing on the key, two impressions of that letter are made in less time than it would take to write one.

Fig. 1 is a top or plan view of this machine, B being one of the sides, and F (and C, Fig. 2) are crossbars, binding the sides together. The types are attached to hammers arranged round a circle so as to strike up against the stud, k, at a common center. The paper is placed in a car, J', d' e' g', between the rollers, h' and i'. The ink-band, p, moves on four rollers similar to l, passing between the two sheets of paper. The transmission of power is by means of wires, such as r s' s'', V V' V'', working on bell cranks, T T' T''; each key, K K' K'' is connected with one of these wires. A spring is attached by a string, S', to the car by means of the hook, V'. This car is kept back by the cord, a', around a barrel b'', which is furnished with a disk, on which are pegs, checked by the escapement, d'', working on the lever, f'', and connected with the bar, g'' h'', common to the tops of all the keys (e'', Fig. 2.) When the car is brought back on the rails, b and c, to begin a new line, the handle, q'', is pulled, and the spider wheel, s'', coming against the lever, S'', is turned two lines. When within four letters of the end of a line, a little bell rings to give warning in time for the word to be divided by a hyphen. The paper is not touched by the operator till the page, which is constantly before his eyes, is finished. With a little practice one can print fifty per cent faster than the ordinary writing.

FIG. II.

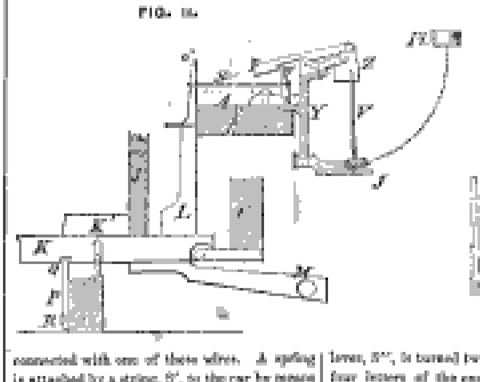


FIG. III.

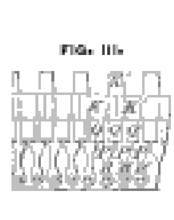


Fig. 2 is a sectional view of one key working on a hinge screwed to the crossbar, C, and having a counterweight, M. Pressing on the key, K or K', that part of L at o'' pulls the wire S, which moves the rocker, p', carrying with it the pawl, p, the hammer, Z Y, screwed on the circle, Y, set into the frame, A, strikes up against the common center, Pl, which is the stud K, Fig. 1.

Fig. 3 is a front view of the stop-bolts under the keys, to prevent more than one going down at the same time. This is necessary on account of there being but a common center for all the types to strike. The stop-bolts, P P' P'', work on the screws, R R' R'', having their tops beveled so as to fit in between the keys, K K' K'', &c. When a key is depressed, the stop-bolts are driven to the right and left of it, and consequently under all the other keys.

Any modifications suitable to a purchaser, such as changing the type, or adapting the machine to the use of blind persons, &c., may be made, by applying to Mr. V. Beaumont, 12 Frankfort street, who has contracted to build the machines. It was patented Oct. 27, 1857. Patent rights and machines for sale at S. W. Francis' office, 442 Broadway, New York.

Soapstone Gas Burners.

Gas burners, usually made of iron or brass, are subjected to some difficulties. The heat of the flame expands the metal and enlarges the opening, causing some waste of gas; and, besides, the metal is liable to corrode, by the action of the gas upon it. To obviate these evils, M. Schwarz, of Nuremburg, Germany, has lately manufactured gas burners from soapstone (steatite), which is prepared for this purpose in a peculiar manner. This stone is cut up into small four-sided slabs, put into hermetically sealed cases, and exposed to a slow fire until it becomes red-hot. Great care is exercised in thus roasting the stone, because if quickly heated, it will rupture by the sudden expansion of small particles of moisture in it. The steatite slabs are exposed to this heat for about two hours, slowly cooled, and are then easily turned to the proper shape in a lathe. After this they are boiled in oil until they acquire a deep brown color, when they are taken out, dried, and made to assume a beautiful polish by simply rubbing them with a woolen rag. The boring of gas burners is an art requiring great care and skill, as the opening of each burner is formed to consume a certain quantity of gas.

Gas burners made as described from soapstone are stated to be perfectly fire-proof, and not liable to any change or alteration in the size of the bore or nature of the material by the strongest heat produced by the combustion of the gas. Liebig, in his "Annals of Chemistry and Pharmacy," gives these burners a very high character, and advises all chemists to employ them in their laboratories, as they are not affected by the largest flames to which they may be exposed in applying them to distillation or other methods of analysis, &c. This is a great advantage which they possess over common metal burners. As soapstone is abundant on our side of the Atlantic, some of our gas-fitters may be induced to try their hand in making them. They must select for this purpose the best specimens, avoid stones having iron veins, and be sure to expel every particle of moisture from them in roasting. Lava has also been used with great success for the manufacture of these useful articles; it is taken from the flanks of Mount Ætna and Vesuvius, and turned in an ordinary lathe.

Vibration of Dams.—Atlantic Telegraph.—Mode of Laying the Cable.

We are daily receiving communications on the subjects above named; but having published so much already pertaining to them, we are forced to decline, for the present, publishing more upon these exhausted subjects, unless some new ideas are set forth. We would advise those who would like to communicate their plans as to the best mode of paying out the cable, to address Cyrus W. Field, President of the Atlantic Telegraph Co., No. 10 Wall st., New York.

Scientific American.

NEW YORK, DECEMBER 26, 1857.

State of Affairs at the Patent Office.

The decision of all applications for patents is determined, in the first instance, by a corps of officers, termed in the patent law, "Examiners." It is their duty to make the necessary searches to ascertain whether the invention before them possesses novelty and utility; if so, to certify the fact to the Commissioner, who thereupon issues a patent. If novelty and utility are not found to exist, then the Examiners report accordingly, and the application is rejected.

The Commissioner is the chief of the Patent Office, and all its actions are regulated by him. He cannot, of course, make a personal examination of every invention, and decide as to its patentability. But he can, and does, lay down the general rules and principles that are to govern the Examiners in their official actions.

Commissioner Holt, soon after assuming the duties of office, expressed his determination to administer the patent laws in that liberal spirit in which it is so evident they were designed to be applied; and he has thus far carried out his intention with much success.

In a series of decisions, which, as a whole, are everywhere admired for their beautiful diction and sound reasoning, he has given expression to rules and principles for the government of the examining corps, so clear and unmistakable that "he who runs may read."

The younger members of the corps have evinced a ready understanding and a prompt concurrence with these expositions; and they endeavor, in all cases, to govern their official actions by them.

But we are sorry to observe that some of the older Examiners, while they do not openly rebel against Commissioner Holt, are, to say the least, very backward, we think, in adopting his rules of action. They *profess* a willingness to follow his instructions; but, somehow, as compared with the younger members, they are curiously *inept* in the practical application of those instructions.

To such a pass does their ineptitude go, that they constantly find themselves unable to agree with their younger brothers, when appeal cases are jointly referred to them. And it is common for inventors who have appeals to present, to entreat the Commissioner not to allow their cases to be referred to certain of the older members; for experience has taught them that they cannot depend upon receiving justice from those sources. Now, we submit that such Examiners are improper persons for appeal boards.

It would, probably, be difficult to find a more able, experienced and industrious corps of scientific men than some of the older Examiners of the Patent Office. But while we admire their abilities, we cannot too strongly condemn their illiberality. As a clique they seem to have imbibed an inveterate prejudice against inventors, and all who entertain views favorable to a liberal management of the Office. They are filled with the gloomiest forebodings, lest too many patents shall be granted, and not enough rejected. Like the hen with her ducklings, they make a great cry against the younger members, because the latter launch out so boldly in the path of duty and liberality.

The younger members have been tried, and are not found wanting. They are men of talent, prudence, and reliability. Their ideas are in keeping with the times. Their official conduct, thus far, is commended and sustained in the most emphatic manner, not only by the Commissioner of Patents and the Secretary of the Interior, but by inventors and all who have business relations with the Office.

Unless we greatly misapprehend his views, President Buchanan is also in favor of the most liberal administration of the affairs of the Patent Office consistent with prudence, and heartily approves of every movement which tends in that direction.

It is folly to suppose that too many patents can be granted. Constant experience proves the contrary. Patent property never commanded such high prices and was never in so great demand as it was just previous to the late commercial crisis; yet the number of patents issued has increased fifty per cent. within four years. So long as the Patent Office construes the law liberally, but not carelessly; avoiding the issuing of two patents for the same thing, but awarding grants for just what the applicant has invented—nothing more, nothing less—under such circumstances the more patents granted the better. It should be the study of the examining officers to see how many patents they can, with any show of propriety, grant—not how many they can reject.

The liberal system is denounced by a few croakers, through fear that, amid the multiplicity of patents, inventors will impose upon the public. But here, again, facts prove the contrary. Never were the public so free from imposition in this respect as at the present time. The greater the number of patents the more careful do purchasers become to avoid being cheated. No man who exercises ordinary prudence will be gulled in the purchase of a patent right. Besides, we repel, with indignation, the idea that inventors are given to such practices. It is notorious that they are generally the victims and sufferers by rascality, but seldom the perpetrators of wrong. Men of thought and genius, engaged in benefiting the world, are rarely seduced into criminal enterprises.

Since the above was written, we learn that Commissioner Holt has appointed a Board of Appeals, to assist him in hearing and reviewing rejected applications. The board is composed of three Chief Examiners, viz., Thomas H. Dodge, DeWitt C. Lawrence, and A. B. Little—all men of ability and experience. The establishment of this board is a movement of great importance, and will form the subject of special remark in our next number.

Philosophical Investigation.

We feel that we can never sufficiently impress the public mind with the fact that each and every one of us has some great work—some special mission—to perform towards unraveling the mighty secrets of nature. Teeming as is the world with objects for our investigation, objects full of beauty, harmony, and interest lying at our feet and thrusting themselves on our notice at every step we take in life, each seeming to cry to man with powerful though mute appeal, "Understand me, unfold my beauties, demonstrate my harmonious relations in the great scheme of creation, and let the world know all the interest that I possess!" To do this is the aim of all philosophy, and to do it in the pure spirit of an honest searcher after truth, is carrying out the real meaning of the word "philosopher," a lover of wisdom.

To be a true philosopher does not, as some suppose, require a vast amount of costly apparatus. The celebrated Dr. Black prosecuted his chemical researches with a few flasks and earthenware cups, and Dr. Dalton, the discoverer of the atomic theory, was almost equally devoid of mechanical aid; a hammer, a magnet, and a few stones are sufficient for a geologist or mineralogist, with sometimes the addition of a level and chain; and a pair of scissors and a sharp knife will serve the anatomist and botanist. Ferguson, the Scottish shepherd astronomer, measured the distances of the stars through pin-holes in a piece of paper, and hundreds of other examples might be cited where genius has triumphed over every difficulty in the pursuit of its favorite study. If these great men have done so much with so little aid, how much ought humble philosophers to do with the means now so amply at their command! Each person knows what object of nature pleases him most. Some like birds, others fishes, some plants, and others stones, and were every one to note down what struck him as being the differences between various animals or stones or plants of nearly the same kind, he would be surprised at the amount of information he had given to the world. To disseminate the results of any scientific investigation, whether from small or great, the columns of the SCIENTIFIC AMERICAN are always open.

Gould, the great living ornithologist, whose life is a romance, first studied birds while a working gardener on the banks of the river Thames, and was dismissed from his situation for shooting kingfishers instead of minding his work; and George Stephenson, the engineer, was but a collier's boy. These examples prove what great things may be done by humble men who enter on the study of nature in a true spirit, for a book full of facts discovered by its author, or a bridge built by a self-taught engineer is a more noble monument than a public funeral or a pyramid. What, may be asked, is the end and aim of this recital of commonplace truths? It is to stir up the latent genius of our country, that she may produce men as great, and results as glorious, as the nations that have gone before her. We are, it is true, a business people, and a trading community, but neither of these are incompatible with philosophical investigation. A man can be a merchant ten hours a day, and a philosopher for four. Let us then begin and do something to aid the advancement of the knowledge of the truths of nature, as we endeavor to advance those of our higher duties of social life—let us begin to think that there are other things worth living for than the possession of wealth—and more glorious legacies to bequeath those whom we leave behind us, when we go to

"That bourne from which no traveler returns,"

than dollars and cents, and let us individually begin to believe that knowledge is a more valuable acquisition than money. When we all do this, we shall be *the* country of the world, and our progress as a nation will be the most glorious in the history of man.

Improvements in Naval Gunnery.

A very interesting report on this subject has just been presented to the Secretary of the Navy by Captain Dahlgren, inventor of the heavy ordnance which now bear his name. A number of years since, he was led to investigate the subject of naval batteries, and the results induced him, in 1850, to propose essential changes in those belonging to our navy. For this purpose he submitted drafts of guns having nine and eleven-inch calibers, and some pieces were cast according to his model in that year, and experimented with up till 1852. As these guns were very unwieldy, however, they were not placed in any of the old ships of war, but were kept for the powerful new screw frigates.

On the 22d of June last, the steam frigate *Plymouth*, with Captain Dahlgren on board, left Washington for a cruise at sea, one object of which was to test these guns—how they could be maneuvered, their efficiency over the old ones of less caliber, &c. The cruise lasted 134 days, but only 100 days were spent at sea. On this vessel there was one 11-inch pivot gun, and a battery of 9-inch guns. The report states, that when the ship has no inclination, the 9-inch guns can be fired as fast as 32-pounders, but when the deck is inclined, the working of the guns is much retarded; still, even at the inclination of 18° a well-drilled crew was able to discharge shells at intervals of 65 seconds, and at an angle of 5° in 33 seconds. This is certainly pretty rapid practice with such large cannon. When the frigate was on an even keel, the large 11-inch pivot gun could not be fired as rapidly as the 9-inch cannon; but it was worked more rapidly when the deck of the vessel was inclined seven or eight degrees. At this angle, 17 shells were discharged in the same time as 13 from the 9-inch guns. As a pivot gun, it was found as manageable as a common 64-pounder; and no difficulty was experienced in making such heavy ordnance secure in the most stormy weather.

It is not stated how far these guns carry. The target was placed only at 1,000 yards' distance, but they can, undoubtedly, send shells ten times farther. The large 11-inch gun is a monster, weighing, with its carriage, no less than 12½ tons.

This is the substance of the report on the Dahlgren guns; but as the frigate, in her cruise, visited several European ports, Captain Dahlgren took the opportunity of examining some of the British naval dockyards, and witnessing the operations conducted in them. In the British navy, sailing vessels have become obsolete, no ship-of-war being now constructed without the use of steam power for propulsion. It would appear, however, that no British heavy ordnance come up, in weight of metal, to the large 11-inch Dahlgren gun. England has 126 steamships-of-war in commission, and 185 steam gun-boats—an immense steam navy. We also learn from the report that a number of large screw frigates are now building in England, to rival in magnitude our new and largest class vessels; one of these, named the *Mersey*, approaches in its dimensions the *Niagara*, which is the largest in our navy, and she is to be armed with cannon of such caliber (viz., forty 68-pounders) as will make her, we understand, the most formidable ship-of-war in the world.

In modern naval gunnery, great improvements have been made over the old methods, by the employment of steamships and huge cannon. We believe that 32-pounders were the largest class of guns employed in the days of Nelson. Ordnance of such caliber are mere pigmies, now-a-days.

The Steamship Adriatic.

The *Canada*, which left Liverpool on the morning of the 5th inst., brings intelligence of the *Adriatic's* arrival. She arrived off Point Lynas at nine o'clock on the evening of the 3d inst., making 10 days and 4 hours from New York, but owing to the lowness of the tide, did not get up the Mersey until the 4th, so that we may say her run to Liverpool was ten days and a half.

We must not, however, judge of her sailing qualities by the first voyage, as it is seldom that a steamship does anything extraordinary on her maiden trip. She may also have encountered bad weather; at any rate, we must not judge of her speed until she has made two or three trips, when she will be in perfect trim and likely to do her best.

The "Leviathan."

By the latest news from Europe, we learn that the launching of this huge vessel was gradually proceeding, and that since the second launching failure, as already noticed by us, she had been moved forty feet nearer the water. At the time when she stuck fast in her ways, defying every attempt to move her, it is related, that a London wag came up to M. Brunel, and took him all aback, by shouting in a theatrical voice that part of Job which says, "Canst thou pull out the Leviathan with a hook?"

The progress of this vessel is very tedious; she has still 107 feet to move, but the engineers, it is stated, have perfect control over her, and hopes are entertained that the launch will after all be perfectly successful, and that, too, at an early date.

About the Last Call.

To those of our friends who are competing for the Fifteen Hundred Dollars offered in prizes, which are to be awarded on the 1st of January, we would remind them that the time for further action is short. Only ten days more and the "polls" will be closed. Some will wish they had augmented their numbers even only by a few names, so close will they come to the award of a larger prize than they will get, unless they send a few more names. Who these are, we cannot tell, but a word to the wise is sufficient for all.

What Constitutes an Equivalent?

In a recent application for a patent for an improved fire-kindling compound or composition, the applicant was rejected on the ground that only one of the ingredients used was new for the purpose, and this new ingredient was merely an equivalent for another which was well known.

An appeal was taken from this decision, and the case referred to a Board of Examiners, consisting of Thos. H. Dodge and T. T. Everett. The latter, in his report to the Commissioner, presents his views upon the question of equivalents in compositions in the following manner:—

United States Patent Office, November 17, 1857.

Application of Elizabeth Bellinger for improvements in composition fuels, or kindling blocks.

The claim of this application rests upon a composition made of ingredients specially named. The ground of the rejections is, that like compositions of other ingredients are known, and there is no invention in substituting one ingredient in this not named as being in other compositions, but having its equivalent in them.

It does not appear to me that this ground is sound. In mechanical arrangements or combinations, the substitution of one well known means for another, where each performs its usual functions, no invention would arise. But it is scarcely tenable ground in compositions of matter, for the great reason that the equivalency of the one article to the other cannot be fully made manifest.

In machines, the operation of the crank in giving motion to a shaft can readily be seen to be the equivalent of the eccentric, and in producing pressure, the cam, as the equivalent of the screw, is made evident.

It cannot be claimed, however, that gum acacia, in a composition, would be the equivalent of gum copal, the first of which is soluble in water, and the latter not. The same statement applies to oils; pure sperm oil contains very little gummy matter, while the oil of the common right whale holds a large quantity of gummy matter. Many other articles—solids or fluids—could be referred to, illustrating this position, but it is unnecessary to cite them on this occasion. The gums and resins of commerce vary, some materially from others, each, in a measure, possessing its undivided characteristics, so that the one cannot generally, as fully as in mechanical means, be the equivalent of the other; and there is, therefore, very good reason for applying the doctrine of equivalents to compositions of this class with great caution, and in fine for not applying it at all.

It is not shown, in the actions of the Office on this application, that any one of the references cited contains the full equivalent of the gum of the *Acacia* tree, or that this gum has been used in like compositions; and in the absence of both, I think the patent should have been granted. I therefore recommend that it be granted.

Respectfully submitted,

T. T. Everett.

To Hon. J. Holt, Commissioner of Patents.

[While we cordially subscribe to the doctrine of equivalents as presented by Dr. Everett in relation to compositions, we cannot fully coincide with his remarks relative to mechanical equivalents. In mechanical combinations it frequently happens that the substitution of one well known means for another produces new and important results, in which case a patent is, with great propriety, issued. Indeed, it is the constant practice of the Office to grant patents under such circumstances.

It would appear that both Examiner Dodge and Commissioner Holt held the same view that we do, for they declined to coincide with the above report except in the allowance of the applicant's petition for a patent.

We presume that Dr. Everett did not intend to have it understood that, in his opinion, mechanical substitutions were never patentable; for his official actions indicate, generally, enlarged liberality on such points. His scientific and legal attainments render him not only an invaluable officer at the Patent Office, but a good representative, in that institution, of the great State whose motto is "Excelsior." Dr. E. is, we believe, the only principal Examiner who hails from the State of New York.—Eds.

Remedies for Cholera and Dysentery.

A correspondent—E. S. Mallory, Seaborn', Ga.—informs us that he has used parched corn with perfect success for curing the last named disease in the above caption. Taken in quantities to suit the appetite, he believes it is superior to creosote, which was recommended by Dr. J. W. Brown, as mentioned a few weeks since in our columns. We must exhort persons to beware of relying on certain specifics as perfect cures for any disease. The fact is, that one thing may prove a perfect remedy to one person affected with a certain disease, which may utterly fail when given to another person of a different temperament, or in a different stage of the same disease. Parched corn, however, is a simple remedy; if it does not cure, it will do no harm. Roasted oatmeal and wheat flour have been given, we know, with success in many cases of dysentery. They are of the same nature as parched corn, but not so palatable, hence they have usually been given with boiled sweet milk.

A late number of the London *Mechanics' Magazine* contains a letter from Henry McCormack, M. D., physician to the Belfast (Ireland) Cholera Hospital, in which he affirms that sulphuric acid is a remedy for cholera. He says: "The elixir of vitriol, which is merely sulphuric acid, diluted with spirit and the addition of a little aromatic, is, as respects cholera, in many cases, the elixir of life. Twenty drops in a little water may be taken every time the bowels are affected, also every two hours for some time afterwards." Dr. McCormack also states that the name of the person who introduced this remedy, like that of many other benefactors of his species, is unknown.

This remedy is now common with our physicians on this side of the Atlantic. The first notice of its efficacy was a recipe given publicly by Dr. Lawrence Reid, of the New York Hospital, during the last visitation of cholera in this city. We suppose he is the *benefactor* who is unknown to Dr. McCormack. The dilute sulphuric acid is given in water sweetened with a little sugar, and is altogether a pleasant drink. Take water six parts by measure, sulphuric acid one part, and mix. Twenty-five drops in water is a dose for an adult, and according to age, from manhood to childhood, subtract a drop for every year. But while sulphuric acid has heretofore been given as a curative only, Dr. McCormack has found it to possess preventive qualities also. He employed it for this purpose at the last outbreak of cholera in Belfast, and with entire success. There is nothing dangerous in the use of elixir vitriol given in such doses as those specified.

Object-Glasses.

No object-glasses of a larger size than seven inches diameter have been made of glass manufactured in England; and, notwithstanding the success of some continental opticians, the procuring of flint-glass fit for object lenses of a larger size seems to be still, in a considerable degree, a matter of accident. There is a telescope in the Russian observatory at Dorpat, having an object-glass of nine inches diameter. Another was prepared for the King of Bavaria, of twelve inches diameter. The object-glass of Sir James South's large telescope is nearly thirteen inches in diameter, and was executed in Paris, of glass manufactured by Guinand. The practical difficulties of forming a good achromatic object-glass for a telescope of large size are so great that it often costs more than all the rest of the instrument. This arises principally from the extreme difficulty of procuring disks of flint glass above a certain size, sufficiently free from veins and imperfections.

The Construction of Dams.

Since the subject of vibration in dams was broached in our columns, we have received quite a number of communications *pro* and *con* in relation to the cause. We cannot present these letters, because they would occupy too much space in our journal, and besides, there is a great similarity in the views and language of some of their authors. Some of the facts contained in them, however, are useful, and afford solid information for the construction of dams to prevent jarring sensations. How is this to be done? Simply by constructing every dam with an irregular ledge or lip, so as to cause a broken body, and not an even sheet of water, to pass over. The testimony in favor of this method of constructing dams, to prevent jarrings, is uniform in all the communications, however much they differ as to the cause of the phenomenon.

In relation to the dam at West Poultney, Vt., Mr. B. F. Neal, who has charge of the shop there, informs us that when it was new, the vibrations were so disagreeable that he caused a breakwater to be placed on its center, to see what effect would ensue. By breaking the sheet of water the jarrings were stopped, in a measure, but when the water was high, and the sheet lapped over the breakwater, they were always stronger. It is somewhat remarkable, however, that when the sheet of water became very thin or very thick, the vibrations entirely ceased—they only occurred when a certain amount of water was passing over.

E. M. Chaffee, of Providence, R. I., informs us that he is acquainted with a dam that produces vibrations, but only under the same conditions as those described by Mr. Neal—never by a thin broken sheet or a very heavy sheet passing over—only a certain amount of water. J. Andrews, of Avon, Conn., affords us similar testimony as to this peculiar fact. He states that on a dam eight rods wide, vibrations are produced by a thin sheet, of about a rod wide, but never by a solid, full and deep sheet of water.

We have already presented our own opinions and those of others as to the cause of these vibrations, and need not repeat them; indeed, this is a secondary question, practically, in comparison with that of remedying the evil. The log which lodged on the dam at Malone, N. Y., stopped the jarrings by breaking the sheet of water; and last winter, during a freshet, the planking of the dam at West Poultney, as we are informed by Mr. Neal, was broken by ice and a bridge that was carried over, since which period the vibrations have entirely ceased. These are sturdy facts, useful to those who may hereafter build dams, or those who desire to cure disagreeable vibrations in some now in existence.

Scientific Books.

The well-known dryness of scientific books is a great barrier to the spread of information, and a still greater objection is that they often pre-suppose that their readers know something about the subject on which they treat beforehand, and, should they even be elemental, they are so extremely simple, both in their philosophy and style, as to be only fit for children. There are, of course, many very good exceptions to this, but that it is the rule no one can doubt. We would therefore recommend to book-writers, and give the hint to the public, that they follow a plan that has been adopted in many French scientific works of great value and sound science. This plan is to devote the few first pages of the book to what are called "preliminary ideas," which is a condensation of the facts of the subject on which the book treats, arranged fact by fact in the order they are afterwards enlarged upon. By this means you gain a thorough insight into the actual facts of the science, with less than one hour's careful reading, and are able to follow the author through any speculative philosophy in which he may indulge, and in every way it adds to the reader's appreciation of the book.

Mining College.

It has been proposed to establish in the north of England a college where all the sciences necessary to fit a man for the better conducting of practical mining operations shall be taught, and that it shall be supported without governmental aid. We are glad to hear of this, and would ask why it is that in this country, where mining operations are capable of being carried on to a great extent, we have no college exclusively devoted to this purpose. There are many institutions where the sciences are well and ably taught, but we are not aware of any where the aim is to turn out a body of talented and able mining engineers. We should like to see the gentlemen who are interested in mineral lands and the geologists and surveyors of this country take the question into consideration, and were they but to make the attempt, we are sure they could erect and establish such an educational establishment as would be worthy of the mineral wealth of our country.

The Glucose of the Sorghum changing to Cane Sugar.

Dr. Augustus A. Hayes, of Boston, assayer to the State of Massachusetts, who has made occasional contributions to our columns, has come prominently before the public during the present year, because of his opinion that the sugar of the Chinese cane would in no case granulate and yield pure cane sugar. An abstract of his paper read before the Scientific Convention at Montreal was published in No. 52 of Vol. XII. of the Scientific American. His investigations, in conjunction with Dr. Bacon of the same city, were compiled and published in an article which he furnished for Mr. Olcott's "Sorgho and Imphee." Subsequently, however, he has made further examination of his samples of sirups, and to his great surprise found that large masses of actual cane sugar crystals had formed in them. The samples of glucose which Dr. Hayes had in his possession, turned into crystalline sugar, by simply standing a certain length of time. Efforts have been heretofore made by chemists, but without success, to obtain crystal sugar from glucose, hence it was concluded that such a conversion of it was impossible. The chemical change referred to, Dr. Hayes announces to be something entirely new, and that it will largely enhance the value of the Sorgho.

Manufacture of Thimbles.

Notwithstanding the facility with which the manufacture of those small but essential implements is carried on by means of molds in the stamping machine, few processes can compare, in ingenuity and effective adaptation, with the contrivance originated by MM. Rouy & Berthier, of Paris. Sheet iron, one twenty-fourth of an inch thick, is cut into strips of dimensions suited to the intended size of the thimbles. These strips are passed under a punch press, whereby they are cut into disks of about two inches diameter, tagged together by a tail. Each strip contains one dozen of these blanks, and these are made red hot, and laid upon a mandrel nicely fitted to their size. The workman now strikes the middle of each with a round faced punch, about the thickness of his finger, and thus sinks it into the concavity of the first mandrel. It is then transferred successively to another mandrel, which has five hollows of successively increasing depth, and, by striking it into them, it is brought to the proper shape. This rude thimble is then stuck into the chuck of a lathe, in order to polish it within; it is then turned outside, the circles marked for the gold ornament, and the pits indented with a kind of milling tool. They are next annealed, brightened, and gilded inside, with a very thin cone of gold leaf, which is firmly united to the surface of the iron by the strong pressure of a smooth steel mandrel. A gold fillet is applied to the outside, in an annular space turned to receive it, being fixed, by pressure at the edges, into a minute groove formed on the lathe.—*North American.*

Correspondents

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$1,500 IN CASH PRIZES.—[illegible]

[illegible]

MUNN & CO., Publishers.

STEAM ENGINES, STEAM BOILERS, [illegible]

HARRISON'S 30 INCH GRAIN MILLS.—[illegible]

SECOND-HAND MACHINISTS' TOOLS.—[illegible]

WOODWORTH'S PATENT PLANING [illegible]

NEW HAVEN MANUFACTURING CO.—[illegible]

ENGRAVING ON WOOD AND MECHANICAL DRAWING, [illegible]

SAWS.—[illegible]

LIME.—PAGE'S PERPETUAL KILN.—[illegible]

WELCH & GRIFFITHS.—[illegible]

AGENTS WANTED IN ALL THE CITIES [illegible]

OIL! OIL! OIL!—FOR RAILROADS, STEAMERS, [illegible]

EXCELSIOR STEAM PUMPS, [illegible]

GUILD, GARRISON & CO.

FORBES & BOND, ARTISTS, [illegible]

ALCOTT'S CONCENTRIC LATHE.—[illegible]

We promised our young readers that we would provide them objects of amusement and instruction, these long dreary winter evenings; and we now hasten to fulfil our promise by providing them, weekly, in this column, with illustrated experiments, teaching some philosophic truth.

The examples which we shall select, however, will only be samples or specimens of the various means that may be adopted to illustrate the same principle. To find these out, and to produce new combinations depending for their action on the same laws, we leave to the ingenuity of our young friends, the results of whose reflections we shall be happy to receive in sketches and descriptions.

Our engravings this week illustrate the subject of balancing. A decanter or bottle is first obtained, and in its cork is placed a needle; on this is balanced a ball of wood, having a cork or wooden figure cut out, standing on the top, such as that seen in the picture. From the ball project two wires bent semicircularly, having at their extremities two bullets. If the little apparatus be made as we have shown, you can give the bullets a twist, and the whole will turn round on the

needle, the figure standing upright all the while, and twist it about from side to side as much as you like, it will always regain its erect position. The two bullets, in this case, cause the center of gravity to fall below the ball on which the figure is placed, and, in consequence, as the center of gravity always assumes the lowest position, it cannot do so without making the figure stand erect, or, in other words, until the bullets themselves are equally balanced. Any boy may whittle one of these little toys out with a jack-knife, and cut any figure that may suit his fancy.

The illustration of the horse furnishes a very good solution of a popular paradox in mechanics: given, a body having a tendency to fall by its own weight; required, how to prevent it from falling by adding to it a weight on the same side on which it tends to fall. The engraving shows a horse, the center of gravity of which is somewhere about the middle of its body. It is evident, therefore, that were it placed on its hinder legs on a table, as the line of its *direction* or center would fall considerably beyond its base, and the horse would fall on the ground; but to prevent this, there is a stiff wire attached to a weight or bullet connected with the body of the horse, and by this means the horse prances on a table without falling off; so that the figure which was incapable of supporting itself is actually prevented from falling by adding a weight to its unsupported end. This seems almost impossible; but when we consider that, in order to have the desired effect, the wire must be bent, and the weight be farther under the table than the horses' feet are on it, the mystery is solved, as it brings the total weight of bullet and horse in such a position that the tendency is rather to make it stand up than to let it fall down.

Saleratus and the Teeth.

The small excitement which some dentists are endeavoring to get up on this question requires that we should again say something on the subject. Our opinion as to the cause of the decay of American teeth, which will be found expressed on page 83 of the present volume of the Scientific American, we still adhere to, namely, that it is principally due to our climate, and not saleratus. We know persons, members of families, by whom the use of cream of tartar and saleratus is carefully avoided, and their teeth are as bad as those who do use these articles in their daily food. Again, no experiment of placing human teeth to steep in solutions of these substances can be satisfactory, for if you immerse a tooth in vitriol, it will be corroded, yet no one has attributed the rapid decay of teeth to the vitriol with which our vinegar is often adulterated, yet with equal truth it might be.

There can be little doubt that decayed teeth do not proceed from one cause, but many. These are trifling in themselves, but, when added up, make a big sum. If we must instance any of these causes, we should give the extreme heat of our summers, when we indulge in iced water, and the arctic cold of our winters, when everything we eat and drink is made as hot as possible. These sudden changes and opposing influences, from heat to cold, cannot but affect the teeth, and by acting on their mass may render the enamel brittle, so that it breaks and leaves the softer parts to be eaten away by any corrosive substance that may be taken into the mouth.

There is also every evidence to prove that the eating of candies is injurious to the teeth, and that we indulge in them too much. In conclusion, we would add that did we eat and drink with more regard to the climate in which we live than we do, not only our teeth but our general health would be improved.

The Coloring of Wood.

Many ornamental woods being very rare, it is often desirable to stain lighter and softer woods in imitation of them. Attempts have been made to stain woods during the time they were growing, by watering them with various colored liquids, but such experiments have not proved satisfactory. The method usually adopted, is to stain it with colored fluids after it has been shaped into the form it is to take.

The naturally light colors of woods are rendered darker by being covered with oil or varnish, though the latter somewhat checks the change into the deepest hues. The yellowish color of most varnishes seriously interferes with the colors of light and delicate woods, for which the whitest kinds should be used. In many cases, the colors of the woods are modified by applying coloring matters, either before or with the varnish; in this way handsome birch wood may be made to assume the appearance of mahogany so exactly as often to escape detection. Since the researches of Dr. Boucherie on the aspirative power possessed by trees, coloring matters have been introduced without difficulty. Those most easily applied are such as are produced by double decomposition between the substances in solution.

Woodcutting Tools.

This invention—which we transcribe from the London *Engineer*—relates to the form of tools for rounding, surfacing, or otherwise operating on wood, and intended as substitutes for the gouges, chisels, or other cutting instruments. The gouge or instrument for taking the first or rough cut is formed of a tube of steel, and ground or otherwise bevel the end from the outside to form the cutting edge all around. The chisel for smoothing is formed of a disk of steel, beveled all round on one side to form the cutting edge.

Fig. 1 is a longitudinal section of the gouge formed according to this invention. As will be observed, it consists of a tube of steel, A, beveled at one end, as at B, so as to produce a sharp cutting edge, as in a gouge, which is presented to and cuts the wood in the same manner as that instrument. It is represented in a position for turning a piece of wood, C, as in a lathe. For this purpose, when it consists of a short tube (part only of which is represented in the illustration) it is supported and secured in a collar or bearing, in which it is free to turn round on its axis. The collar support is mounted on a face plate, slide rest, or other suitable support, to enable it to act on the wood as required. For turning wood in a lathe, this instrument is also applicable as a hand gouge, for which purpose it is formed of smaller diameter and of greater length, and finished with a suitable tang and handle for holding it by. The interior of the tube should have a free passage through, and be large enough to allow the shavings to pass freely, and prevent the interior becoming choked with shavings. The gouge is adapted for other uses than turning, such as planing surfaces by machine, or for rounding, or otherwise acting as a gouge on the wood under operation. This form of tool presents a great extent of cutting edge, and therefore need not be removed so frequently from the machine for sharpening as ordinary tools, while at the same time, by turning them round gradually, or by a little at a time, a fresh cutting edge is constantly presented to the wood until the instrument has made a complete turn. This turning of the gouge may be done either by hand, a little at a time, or a ratchet wheel or other gear may be placed in connection with the bearing socket of the tool, which is caused to rotate slowly by the action of the machine in a self-acting manner. The bearing socket may be stationary or movable, so as to present and move the gouge according to the cutting purpose required.

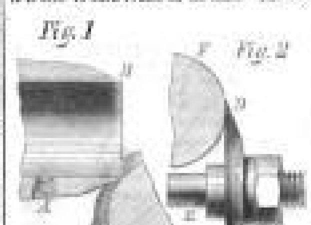

Fig. 2 represents an edge view of a smoothing tool, formed and mounted according to this invention. It is represented as applied in turning or rounding, for which, perhaps, this tool is best adapted; but it may be applied as a smoothing tool in other operations of woodcutting. It consists of a disk of steel, D, beveled from the one side, so as to form a cutting edge all round on the other side. It is mounted on a spindle, E, and may be supported on suitable bearings, and carried by a slide, whereby it is traversed along the piece of wood, F, under operation; or the wood may be traversed across the face of the tool, and at the same time caused to rotate; or the tool may be caused to move round the wood, and the wood simply traverse past the tool. If supported on centers, or otherwise freely mounted, the action of cutting may induce a slow rotary motion of the tool, which will thereby constantly bring up a fresh cutting edge; or the tool may be turned by the self-action of the machine, some moving part of it communicating the requisite motion to its axis; or the tool itself may be occasionally caused to rotate on its axis, E, by hand.

Gasproof Rubber Pipe.

This is an article of recent introduction, prepared by a new process of vulcanizing rubber. It is rendered perfectly impervious to gas by the use of a composition which forms a chemical union with the rubber, without in the least impairing its elasticity; so that the pipe is quite as serviceable as metal, while it is much more easily applied to all kinds of works and can be manufactured of any size for a mere trifle over the cost of the rubber.